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## SCIENTISTS STUDY POTATO STARCH FOR NUTRITIONAL AND INDUSTRIAL APPLICATIONS

Most cooks are familiar with the thickening properties of corn starch, but potato starch is every bit as much up to the job, say scientists with Agriculture and Agri-Food Canada (AAFC). They're working on a project to further examine the structure and functional properties of potato starch, improve the nutritional quality of potato foods, and develop new uses for modified potato starch in food processing, pharmaceutical and industrial applications. Potato starch is currently used by the food processing industry as a general thickener, binder, texturizer, anti-caking or gelling agent. It also shows up in finished products such as snack foods, processed meats, baked goods, noodles, pet foods, shredded cheese, sauces, gravies and soups. Potato starches are also used in yeast filtration and as additives in the cosmetics and pharmaceutical industries.

AAFC's research team is lead by Dr. Qiang Liu, a food scientist at the Guelph Food Research Centre in Guelph, Ontario. The project includes plant breeders, food scientists, molecular biologists and plant production specialists from AAFC research centres across Canada including Lethbridge, Alberta, St-Hyacinthe, Quebec, Fredericton, New Brunswick, Guelph and Ottawa, Ontario.

"Our team is examining many aspects and uses of potato," says Dr. Liu. "We are working directly with our potato breeders in Fredericton and Lethbridge to produce new potatoes with desirable starch structure and increase in the content of 'resistant starch' and 'slowly digestible starches' in the processed potato foods.

'Resistant starch' refers to the starch in starchy foods that is not digested or absorbed in the small intestine. This resistant starch reaches the large intestine essentially intact where it is considered to have similar physiological effects and health benefits of fibre – that is, provides bulk, protects against colon cancer, improves glucose tolerance and insulin sensitivity, and lowers plasma cholesterol and triglyceride concentrations.

Members of the research team are studying aspects of resistant starch formation and characteristics during the food processing, starch digestion and its effect on human nutrition and disease prevention. This information may be a valuable tool in treating and preventing several health issues such as diabetes and cardiovascular disease.

"From here we hope to formulate a value-added potato starch with improved nutritional properties. It will benefit both consumers and the food processing industry," emphasized Dr. Liu. "The possibilities are endless. We are collaborating with the University of Toronto on possible pharmaceutical applications. Our goal is to further develop a new modified potato starch to be used as a pharmaceutical excipient, an inactive substance used as a carrier for the active ingredients of a medication. Pharmaceutical excipients derived from renewable, green sources are more environmentally friendly and less energy-dependent than synthetic polymers."

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The team is also developing effective, high performance and environmentally-friendly packaging materials from thermoplastic starch blends in collaboration with McMaster University. The objectives of the research are to develop potato polysaccharide based bioplastic film and foam (based on complex carbohydrates found in plants), and to improve the performance of potato-based bioplastic.

"Polysaccharide-based polymers and blends are currently used to make bioplastic, a new generation of materials that are able to significantly reduce environmental impact by being completely biodegradable," says Dr. Liu. "Improvements to bioplastics are needed to broaden their applications including greater water resistance, stronger mechanical properties and greater processability."

"We hope to evaluate the functional properties of these improved bioplastic blends and use them to create new packaging and delivery materials," stated Dr. Liu.

It's a surprisingly complex portfolio of applications for the starch and non-starch polysaccharides derived from the humble potato, a staple food grown throughout the world. It's no wonder that the United Nations has designated 2008 as the International Year of the Potato. In fact the potato is only the second crop, following rice in 2004, to receive this noteworthy recognition in a year long celebration.

To learn more about research conducted by AAFC scientists, please visit [www.agr.gc.ca/scienceandinnovation.com](http://www.agr.gc.ca/scienceandinnovation.com).